

Health and Safety Plan for the Accelerated Retrieval Project

October 2009

ICP/EXT-04-00209
Revision 13
Project No.: 23927

Health and Safety Plan for the Accelerated Retrieval Project

October 2009

**Idaho Cleanup Project
Idaho Falls, Idaho 83415**

**Prepared for the
U.S. Department of Energy
Assistant Secretary for Environmental Management
Under DOE Idaho Operations Office
Contract DE-AC07-05ID14516**

ABSTRACT

This health and safety plan identifies the procedures and requirements used to eliminate or minimize health and safety risks to personnel performing operational and construction tasks associated with performing targeted waste retrieval for the Accelerated Retrieval Project in the Subsurface Disposal Area (SDA) of the Radioactive Waste Management Complex. These activities are part of the Idaho Cleanup Project at the Idaho National Laboratory. This plan has been prepared to meet Occupational Safety and Health Administration standards.

This plan contains the assessment and associated mitigation of safety, health, and radiological hazards for conducting operational and construction activities within the SDA for the Accelerated Retrieval Project. Safety, health, and radiological professionals assigned to support the project define the most appropriate hazard control and mitigation measures based on project specific conditions and make changes to associated work control documents, as appropriate.

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ACRONYMS

AED	automated electronic defibrillator
ALARA	as low as reasonably achievable
Anti-C	anti-contamination
ARP	Accelerated Retrieval Project
CC	construction coordinator
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	code of federal regulations
COC	contaminant of concern
CRZ	contamination reduction zone
CWI	CH2M-WG Idaho, LLC
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy, Idaho Operations Office
DPS	drum packaging station
EAM	emergency action manager
EDF	engineering design file
EPA	U.S. Environmental Protection Agency
EPI	emergency plan implementing procedure
ERO	Emergency Response Organization
EZ	exclusion zone
FMM	fissile material monitor
FMT	Facility Monitoring Team
HASP	health and safety plan
HAZWOPER	hazardous waste operations and emergency response
HEPA	high-efficiency particulate air
HSO	health and safety officer
ICP	Idaho Cleanup Project
IH	Industrial Hygiene/industrial hygienist

INL	Idaho National Laboratory (formerly INEEL)
ISMS	Integrated Safety Management System
JSA	job safety analysis
LLW	low-level waste
LWP	laboratory wide procedure
MCP	management control procedure
NFM	nuclear facility manager
O	order
OF	operations foreman
OMP	Occupational Medical Program
OSHA	Occupational Safety and Health Administration
PCM	personnel contamination monitor
PPE	personal protective equipment
PRD	program requirements document
RadCon	Radiological Control
RCT	radiological control technician
RCRA	Resource Conservation and Recovery Act
RE	Retrieval Enclosure
RFP	Rocky Flats Plant
RWMC	Radioactive Waste Management Complex
RWP	radiological work permit
SDA	Subsurface Disposal Area
SOM	Shift Operations Manager
SS	shift supervisor
STD	standard
SWB	standard waste box
SWP	safe work permit
SZ	support zone
TPR	technical procedure

TRU	transuranic
VOC	volatile organic compound
VPP	Voluntary Protection Program
WCC	Warning Communications Center
WIPP	Waste Isolation Pilot Plant
WMF	Waste Management Facility

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Health and Safety Plan for the Accelerated Retrieval Project

1. WORK SCOPE

1.1 Purpose

This health and safety plan (HASP) identifies health and safety hazards and the procedures and requirements used to eliminate or minimize health and safety risks to personnel performing operational and construction tasks associated with the Accelerated Retrieval Project (ARP) in the Subsurface Disposal Area (SDA) of the Radioactive Waste Management Complex (RWMC; Figure 1-1). The activities addressed in this HASP are part of the Idaho Cleanup Project (ICP) at the Idaho National Laboratory (INL).

The ARP is being conducted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) to implement the targeted waste retrieval component of the selected remedy for Operable Unit 7-13/14 as outlined in the Record of Decision (DOE 2008). The focused objective of targeted waste retrieval is to remove specific waste forms that are highly contaminated with solvents, transuranics, and uranium. Targeted waste streams are Rocky Flats Plant Series 741 sludge, Series 742 sludge, Series 743 sludge, graphite, filters and roaster oxides. The performance measure for targeted waste retrieval is removal of a minimum volume of 6,238 m³ from a minimum of 5.69 acres of 10 discrete portions of the SDA identified in the ROD as illustrated on Figure 1-1.

This HASP has been written to meet the requirements of the Occupational Safety and Health Administration (OSHA) standard, “Hazardous Waste Operations and Emergency Response” (29 Code of Federal Regulations, [CFR] 1910.120; 29 CFR 1926.65) and addresses all ARP operational and soil intrusive construction processes in the SDA being implemented by CWI. Accordingly, this HASP applies to operational and soil intrusive construction processes associated with ARPs I, II, III, IV, V, VI, and VII (Figure 1-1). This HASP will be reviewed and revised, as appropriate, by the ARP health and safety officer (HSO) in consultation with Industrial Hygiene (IH), Industrial Safety, and Radiological Control (RadCon) support personnel to ensure its effectiveness and suitability for ARP activities associated with all retrieval areas. Application of the HASP to activities in retrieval areas where operations have not commenced (i.e., ARPs IV, V, VI, and VII) is appropriate given the similar scope and hazards associated with targeted waste retrieval from all retrieval areas being exhumed under the ICP. This HASP may also apply to soil-invasive activities in the SDA and to all other operational activities in the RWMC SDA (i.e., not ARP-related), as evaluated and documented by the ARP HSO based on actual field conditions.

Work control documents developed in accordance with standard (STD)-101, “ICP Integrated Work Control Process,” or management control procedure (MCP)-3562, “Hazard Identification Analysis and Control of Operational Activities,” provide work-specific hazard identification and mitigation. Work control documents will roll down applicable safety and health requirements from the following sources as a minimum.

- ICP Manual 14A, Occupational Safety and Fire Protection
- ICP Manual 14B, Occupational Medical and Industrial Hygiene
- ICP Manual 15A, ICP Radiological Control
- ICP Manual 15B, Radiation Protection Procedures
- ICP Manual 15C, Radiological Control Procedures

- ICP Manual 15D, Radiological Instrument Calibration Procedures
- ICP Manual 9, Operations (applicable procedures including lockout/tagout procedures.)

1.2 Applicability and Jurisdiction

Project operations are conducted under the administrative controls of a safety analysis. Technical procedures (TPRs), job safety analyses (JSAs), and other appropriate project health and safety evaluations are conducted to ensure operations are in compliance with the facility authorization basis. Project operations fall within the jurisdiction of the ARP/Decontamination & Decommissioning (D&D) area project manager. This HASP applies to all personnel entering or conducting ARP operations and soil intrusive construction activities in the SDA.

1.3 Site Description of the Idaho National Laboratory

The INL is a U.S. government-owned test site located 53 km (32 mi) west of Idaho Falls in southeastern Idaho and managed by the U.S. Department of Energy (DOE). The INL encompasses approximately 2,305 km² (890 mi²) of the northeastern portion of the Eastern Idaho Snake River Plain. The plain is a relatively flat, semi-arid, sagebrush desert with predominant relief being manifested either as volcanic buttes jutting up from the desert floor or as unevenly-surfaced basalt flows or flow vents and fissures. Elevations on the INL range from 2,003 m (6,572 ft) in the southeast to 1,448 m (4,750 ft) in the central lowlands, with an average elevation of 1,516 m (4,975 ft). Drainage within and around the plain recharges the Snake River Plain Aquifer, a sole-source aquifer that flows beneath the INL and surrounding area. The aquifer is approximately 137 m (450 ft) below ground surface within the Site boundaries. Regional groundwater flow is southwest at average estimated velocities of 1.5 m/day (5 ft/day).

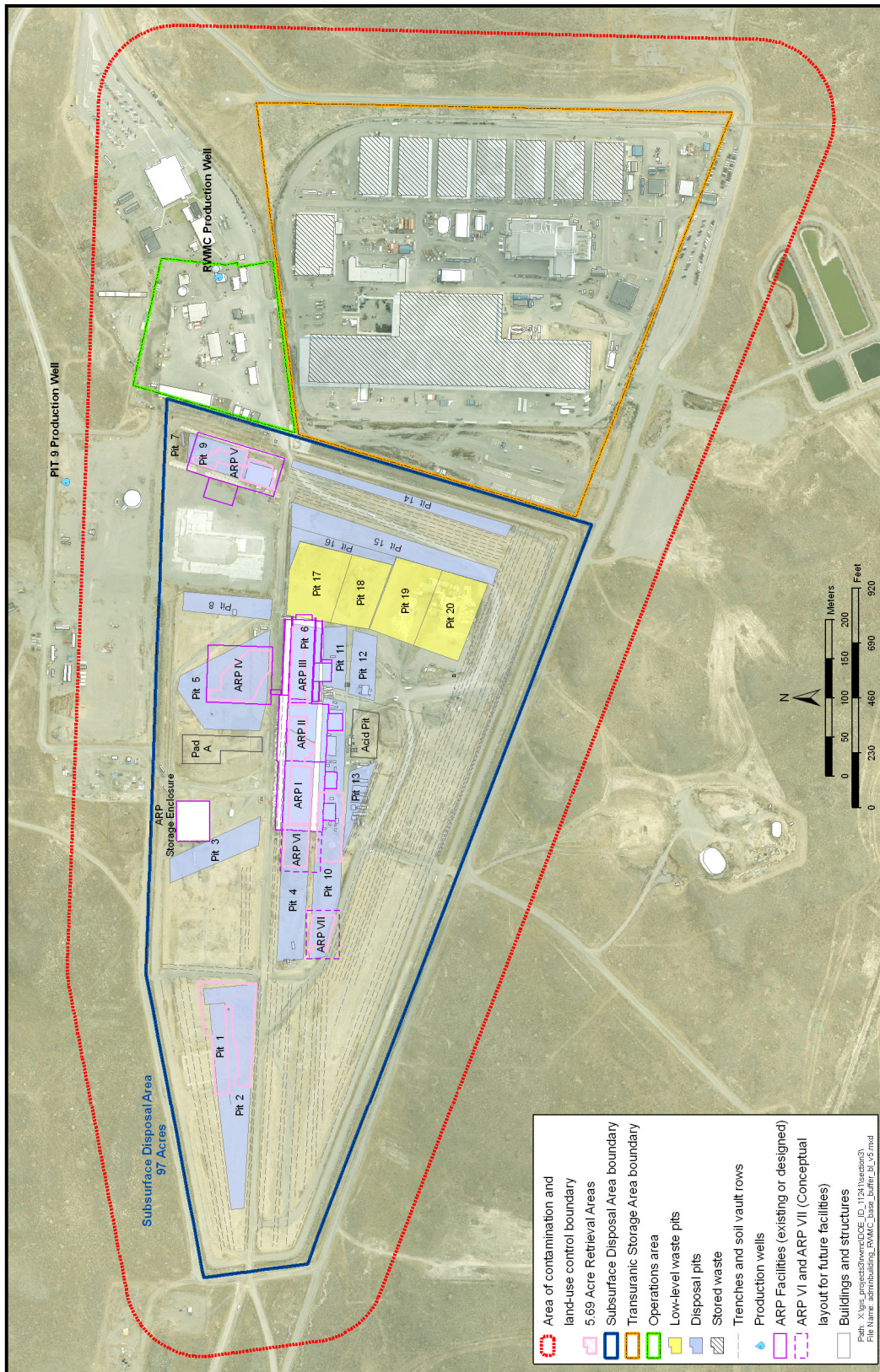


Figure 1-1. Map showing the ARP areas.

1.4 History of the Radioactive Waste Management Complex

The RWMC was established in the early 1950s as a disposal site for solid low-level waste (LLW) generated by operations at the INL and other DOE laboratories. Radioactive waste materials were buried in underground pits, trenches, soil vault rows, and one above-ground pad (Pad A) at the SDA. Transuranic (TRU) waste is kept in interim storage in containers on asphalt pads at the Transuranic Storage Area. Radioactive waste from the INL was disposed of in the SDA starting in 1952. Rocky Flats Plant (RFP)^a TRU waste was disposed of in the SDA from 1954 to 1970. Post-1970 TRU waste is kept in interim storage in containers on asphalt pads at the Transuranic Storage Area. The TRU waste is a result of INL support for the nuclear energy mission of the United States, both as a research laboratory and a waste management facility.

In August 1987, in accordance with the Resource Conservation and Recovery Act (RCRA) (42 USC § 6901 et seq., 1976), DOE and the U.S. Environmental Protection Agency (EPA) entered into a *Consent Order and Compliance Agreement* (DOE-Idaho Operations office [ID] 1987). The *Consent Order and Compliance Agreement* required DOE to conduct an initial assessment and screening of all solid and hazardous waste disposal units at the INL and set up a process for conducting any necessary corrective actions. On July 14, 1989, EPA (under the authority granted to them by CERCLA [42 USC § 9601 et seq., 1980], as amended by the Superfund Amendments and Reauthorization Act [Public Law 99-499, 1986]) proposed the INL be listed on the National Priorities List (54 FR 29820, 1989). The final rule that listed the INL on the National Priorities List was published on November 21, 1989 (54 FR 48184, 1989). On December 4, 1991, because of the INL's listing on the National Priorities List, DOE, EPA, and the Idaho Department of Health and Welfare entered into the *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory* (DOE-ID 1991). The Federal Facility Agreement and Consent Order established the procedural framework and schedule for developing, prioritizing, implementing, and monitoring response actions at the INL in accordance with CERCLA, RCRA, and the Idaho Hazardous Waste Management Act (Idaho Code § 39-4401 et seq., 1983).

The FFA/CO identifies RWMC as Waste Area Group 7, and OU 7-13/14 is the designation for the comprehensive, final investigation and remediation of RWMC. A remedy for contamination at the RWMC was selected in the OU 7-13/14 Record of Decision (ROD) (DOE-ID 2008a) in September 2008. The remedy addresses all of Waste Area Group 7, with focus on the primary source of contamination within the area, which is waste buried in the SDA radioactive waste landfill. Remedial actions specified in the ROD address controlling the source—buried waste—and contaminants migrating to the subsurface (beyond the source zone) and the underlying Snake River Plain Aquifer.

1.5 ARP Overview

The basic concept of the ARP comprises limited life retrieval facilities and facilities to house storage of wastes. Waste exhumation occurs in retrieval enclosures (RE) that are large tent-like structures (metal frame with fabric tension membrane exterior) designed to encompass the respective retrieval area to limit the spread of contamination and provide protection from the weather. Structures, equipment, and the systems used for retrieval are, to the extent practical, standard commercial products using standard fabrication techniques.

The project is designed and constructed to ensure adequate protection for the public, workers, and environment from project hazards. This is achieved through code compliance and/or hazard analysis.

a. The RFP, located 26 km (16 mi) northwest of Denver, Colorado, was renamed the Rocky Flats Environmental Technology Site in the mid-1990s. In the late 1990s, it was again renamed to its present name, the RFP Closure Project.

Nuclear safety, criticality safety, fire protection, radiation protection, environmental protection, and natural phenomena hazard (NPH) mitigation are all addressed in the design.

Commitments of DOE to the state of Idaho and EPA contain enforceable deadlines that require exhumation of a minimum volume of 6,238 m³ of targeted waste from a minimum of 5.69 acres of the SDA as illustrated on Figure 1-1, per the “Agreement to Implement U.S. District Court Order Dated May 25, 2006.” The ARP, originally implemented in 2004, represents a demonstrated approach for safely exhuming, characterizing, and packaging waste from the SDA, transferring the newly packaged containers to the Advanced Mixed Waste Treatment Project (AMWTP) for final characterization and shipment to the Waste Isolation Pilot Plant (WIPP) in New Mexico. Although the controlling documentation directing the exhumation (Agreement, ROD) identifies 10 primary and 11 secondary retrieval areas that may be subject to exhumation in the future, this HASP addresses exhumation and waste packaging activities only associated with ARP areas I-VII based on CWI’s current contractual obligations and defined work scope.

Construction of retrieval facilities (RFs) in the respective retrieval areas will continue simultaneously with ongoing waste retrieval operations. At the time this revision was prepared, exhumation of waste in the ARP I and ARP II areas was complete, exhumation was ongoing in ARP III, construction activities were ongoing for ARP IV and planning and design activities were underway for ARPs V, VI, and VII. Use of ARP I, II, and III retrieval facilities to support characterization, examination, and repackaging of waste from other retrieval areas is a planned activity (e.g., ARP I and II drum packaging stations are being used for waste from ARP III and will be used for waste from ARP IV).

1.5.1 ARP Retrieval Facilities

The ARP I retrieval facility includes a RE (Waste Management Facility [WMF]-697) with two attached airlock structures and support facilities (Figure 1-1). Facilities for ARP II include an RE (WMF-1612 [connected to WMF-697]) with one airlock, covering portions of Pit 4 and Pit 6. Facilities for ARP III include an RE (WMF-1614 [connected to WMF-1612]) with one airlock covering portions of Pit 6. Construction of ARP IV (WMF-1615) is nearing completion to retrieve waste from Pit 5. ARP IV employs an RE without air locks or equipment service facilities - a connecting vestibule to ARP III permits use of the waste packaging and equipment service facilities in the earlier ARP Retrieval Facilities. Design and subsequent construction of ARP V (WMF-1617) has been initiated to retrieve waste from Pit 9. ARP V will include a RE built on the foundation of the former GEM facility (WMF-671). ARP V will have an airlock portioned to contain drum packaging stations and equipment service facilities. Design of ARP VI and VII is to be determined although the approximate location is illustrated on Figure 1-1.

The retrieval facilities are temporary structures that house waste retrieval, sorting, sampling, and packaging activities. The REs provide weather protection and allow for year-round operations for these activities. They have sufficient space and interior height to house excavator operations and waste-container movement. One or two airlock structures may be attached to each RE. These structures are separated from the RE and provide a buffer area for workers to package retrieved waste, remotely observe excavation activities, perform decontamination activities, service vehicles, and provide for personal protective equipment (PPE) changeout. The airlocks are insulated, tensioned-membrane, fabric structures. The fabric membranes are attached to a steel truss structure resting on concrete slab and foundation. The airlocks are equipped with supplementary air heating, ventilating, and air conditioning (HVAC) to supply conditioned air for human comfort. Ventilation flows from the occupied, uncontaminated area of the airlocks, through to contaminated areas, into the retrieval enclosure, and out through HEPA filters. This ventilation flow path is designed to minimize the spread of contamination. Ventilation flow that is adequate for contamination control is maintained in occupied areas during facility operations.

1.5.1.1 Operational Support Facilities. Operational support facilities include mobile fissile material assay unit(s), high and low pressure breathing air unit(s), sample support unit, and operations support trailers. The support facilities support operations, including providing a general work area, a viewing area with monitors for visual observation, minimal lab capabilities, personal protective equipment (PPE) changeout, storage, and utility housings. An adequate number of toilet facilities, with at least one hand-washing facility, are provided near WMF-697/WMF-1612/WMF-1614 for employee use. These facilities are positioned near the REs and are used by operations to support the activities performed onsite in the SDA and within the RE.

1.5.1.2 Site Preparation Activities. Continued ARP site preparation construction activities may include the following:

- SDA overburden soil removal, contouring, and surface preparation activities
- Relocation of utilities, including electrical services, to accommodate RE expansion
- Modification or abandonment of existing monitoring wells and probeholes that interfere with future ARP structures
- Installation of additional expanded RE foundations
- Installation of additional airlocks.

1.5.2 ARP Operations

ARP provides a cost-effective method of retrieving and managing SDA waste material, while maintaining protection of the workers, public health, and the environment. The basic concept comprises waste retrieval and placement in lined waste trays inside the RE retrieval area; transfer of the waste trays into the associated airlock's drum packaging stations (DPSs) for placement into drums; assay of the waste drums after release from the associated airlock; and storage in WMF-698 or other designated storage location. Other processes necessary for the safe handling and processing of the waste and waste drums will be performed as determined necessary by the project.

1.5.2.1 ARP Waste Retrieval and Handling Operations. An equipment operator in PPE operates an excavator to retrieve waste material from the retrieval area (see Figure 1-1) and place it into a designated tray equipped with a liner. Another operator in PPE operates a forklift to transport the waste trays to and from the DPS, to return nontargeted waste back to the pit, and perform other required material-handling tasks inside the RE. The excavator and telehandler forklift cabs are equipped with a breathing air system and a HEPA-filtered forced-air blower system providing a positive pressure inside the cabs. Personnel access into the RE retrieval area is limited to operators protected by a cab ventilation system during waste retrieval activities, but other individuals in PPE may be allowed inside the RE retrieval area when no waste retrieval activities are being performed, (e.g., radiological control technicians [RCTs], ARP operators, and maintenance personnel).

The waste zone material is retrieved using the excavator. The pits are expected to be approximately 6.1 to 8.5 m (20 to 28 ft) deep, and the walls will be sloped to maintain stability. Personnel and equipment operated by personnel will not enter the excavation pit area without first evaluating the pit for sloping, stability, and other safety considerations in accordance with program requirements document (PRD)-22, "Subsurface Investigations, Excavation, and Surface Penetration."

At the digface, the excavator operator vents the drums and retrieves waste from the excavation pit. Once brought up on the deck, the waste material is visually examined. At that point, non-targeted waste is returned to the excavation, or staged for later reburial, and targeted waste is placed/dumped in a tray with

a liner. The targeted/non-targeted waste determination is made by visual exam personnel assisting the excavator operator by way of closed-circuit television cameras. Any closed containers (i.e., liquid bottles, paint cans) are removed from the trays of targeted waste prior to the trays being transported to the DPSs. Closed containers will not knowingly be taken into the DPS unless their contents have been identified and it is deemed safe to do so by project management. Trays are transported to the DPSs via the forklift.

At the DPS, ARP operators, assisted by visual examiners, evaluate the waste to determine if it is targeted waste, nontargeted waste, special case waste, OU 7-13/14 items of interest, WIPP-prohibited items, or incompatible materials. The operations foreman (OF) and technical subject matter experts are consulted, as necessary, to ensure safe waste handling and processing inside the DPS. WIPP-prohibited items are removed, and the tray liner is then hoisted and loaded into a drum or standard waste box (SWB).

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2. HAZARD IDENTIFICATION AND MITIGATION

Potential hazards and mitigation actions for ARP work scope are evaluated per the ICP Integrated Work Control Process including STD-101 or MCP-3562. Additional work scope and/or hazards are identified as part of a job-specific JSA and/or other applicable work control documents/permits. The following sections outline general hazard identification, evaluation, and control strategies.

Operation of the ARP facilities presents physical, chemical, and radiological hazards to personnel. Identification and mitigation of these hazards is imperative to prevent injury or exposure to personnel conducting these activities. The Integrated Safety Management System (ISMS) and Voluntary Protection Program (VPP) are fully implemented at the RWMC. These DOE programs ensure careful work planning, execution, and feedback for all activities in the ARP. All CH2M-WG Idaho, LLC (CWI) employees and subcontractors receive extensive and continuing training on the ISMS and VPP. The safety and health requirements from the following manuals are identified and included in the work control documents as applicable for hazard mitigation:

- ICP Manual 9, *Operations* (applicable procedures including lockout and tagout procedures)
- ICP Manual 14A, *Occupational Safety and Fire Protection*
- ICP Manual 14B, *Occupational Medical and Industrial Hygiene*
- ICP Manual 15A, *ICP Radiological Control*
- ICP Manual 15B, *Radiation Protection Procedures*
- ICP Manual 15C, *Radiological Control Procedures*
- ICP Manual 15D, *Radiological Instrument Calibration Procedures*.

Subcontractors utilize the ICP “Subcontract Requirements Manual” documents (table of contents [TOC]-59) instead of safety and health requirements in Manuals 14A and 14B. The applicable work control documents provide hazard identification and mitigations for ARP activities.

The following section identifies the chemical, radiological, safety, and environmental hazards that personnel may encounter while conducting project operational and construction activities. Hazard mitigations are implemented through a combination of designed engineering controls with other work controls (e.g., TPRs, work orders, JSAs, safe work permits [SWPs], and radiological work permits [RWPs]). This hazard mitigation strategy is used to eliminate or mitigate project hazards to the extent possible in accordance with PRD-25, “Activity Level Hazard Identification, Analysis, and Control.” The process is on-going, in that when new conditions or situations are encountered, these new conditions or situations are subjected to the complete ISMS process.

2.1 Chemical and Radiological Hazards and Mitigation

Personnel may be exposed to industrial safety hazards or to radiological, nonradiological, and physical agents while conducting project operations and construction. Designed engineering controls are implemented along with work procedures, real-time monitoring of contaminants, project facility-specific hazard training, and continuing training to mitigate potential hazards and exposures. Formal preplanning (e.g., job walk-down, completion of the hazard profile screening checklists, and pre-job briefing checklists), JSAs, and other work controls are written using the hazards identified through the ISMS program process. The documents generated in the ISMS process specify the specific operational hazard mitigation measures to follow.

2.1.1 Radiological Material Inventory

The radiological material inventory in the SDA is discussed in Safety Analysis Report (SAR)-4, "Safety Analysis Report for the Radioactive Waste Management Complex," its supporting document Engineering Design File (EDF)-6750, "RWMC Accident Analysis Information Based on Acceptable Knowledge," and a final version of EDF-3543, "SDA Inventory Evaluation for ISG, ISV, and ISTD PDSA Source Terms." Some uncertainties about the radioactive material inventory exist. Therefore, several sources of information were used in the EDF to determine the most conservative, average, and bounding inventories. These include an evaluation of shipping records, nondestructive examination data on aboveground waste, inventory database evaluation, SDA probe data, and sample data at the RFP. The uncertainty in waste shipping records, process knowledge, and calculation methods precludes determining exact quantities; however, these estimates are the result of careful analysis and the best professional judgment.

Rather than develop SDA pit or trench specific inventories, the EDF develops representative radioactive and nonradioactive material inventories per drum and areal-drum densities at the SDA. The EDF addresses all waste types buried in the SDA, including TRU waste, contact-handled LLW, and remote-handled LLW. It also addresses nonradioactive hazardous materials that are part of the mixed TRU and LLW waste. The areas analyzed include the closed pits (Pits 1 through 16), the open pits (Pits 17 through 20), all trenches (Trenches 1 through 58), and all soil vault rows (Rows 1 through 21). While the EDF addresses areas of the SDA that will not be excavated, it represents bounding inventories for the project.

Using the methodology in EDF-3543 for determining large-area TRU inventories, the inventory for the ARP is estimated to be approximately 23,197.9 Ci of Pu-239 equivalents. This inventory includes trench data, but is considered representative of the SDA pits.

2.1.2 Nonradiological Inventory

The chemical inventory in the SDA is developed in EDF-3543 and evaluated in SAR-4. based on EDF-5307, "Chemical Compatibility and Inventory Evaluation for the Accelerated Retrieval Project and the Accelerated Retrieval Project II." EDF-3543 also provides a methodology that can be used to determine the chemical inventory for this project. While the EDF addresses areas of the SDA that will not be excavated as part of this project, it represents bounding inventories for the project. The uncertainty in waste shipping records, process knowledge, and calculation methods precludes determining exact quantities; however, these estimates are the result of careful analysis and best professional judgment.

Additional trace or small quantities of potential chemical contaminants are present in the waste zone, and are identified in the acceptable knowledge report for the ARP (CCP 2007). The chemical compatibility for the waste materials was evaluated in EDF-5307. EDF-5307 concluded, "An examination of inventory records and Acceptable Knowledge (AK) documentation and consideration of possible binary combinations of waste because of incidental mixing during retrieval operations reveals no incompatible combinations of waste, providing the repackaged waste is stored at ambient temperatures. The possibility of encountering unknown discarded chemicals in the waste cannot be excluded. Any unidentifiable bottles found in the waste should be treated with appropriate caution by expert personnel."

A number of nonradioactive hazardous materials of concern in the SDA are present in trace amounts, of which presence or location cannot be verified, and for which quantities are unknown. These materials include picric acid, at least two 25-lb packs of sodium or potassium cyanide, lithium oxide from RFP battery waste, nitrobenzene, and polychlorinated biphenyls (Einerson and Thomas 1999). Nitrocellulose is a fire and explosion hazard. An analysis has been performed on the likelihood of explosive quantities of nitrocellulose present in the SDA and the likelihood of nitrocellulose formation in

the SDA. This analysis concluded that the likelihood of a nitrocellulose explosion or the formation of nitrocellulose in the SDA is highly improbable (Einerson and Thomas 1999).

Table 2-1. Nonradiological hazardous materials inventory for the SDA and estimated for the ARP excavation size.

Chemical	Chemical Abstract System #	Average SDA Density (g/ft ³)	Excavation Area (ft ²)	Average Inventory (g)
1,1,1-trichloroethane	71-55-6	1.70E+02	22,220	3.78E+06
1,1,2-trichloro-1,2,2-trifluoroethane	76-13-1	1.30E+01	22,220	2.89E+05
2-butanone	78-93-3	5.60E-02	22,220	1.24E+03
Acetone	67-64-1	1.80E-01	22,220	4.00E+03
Aluminum nitrate nonahydrate	7784-27-2	3.40E+02	22,220	7.55E+06
Ammonia	7664-41-7	2.50E+00	22,220	5.56E+04
Anthracene	120-12-7	6.50E-04	22,220	1.44E+01
Antimony	7440-36-0	1.40E-03	22,220	3.11E+01
Aqua Regia	NA	4.50E-05	22,220	1.00E+00
Arsenic	7440-38-2	1.60E-06	22,220	3.56E-02
Asbestos	1332-21-4	6.70E+00	22,220	1.49E+05
Barium	7440-39-3	1.70E-05	22,220	3.78E-01
Benzene	8032-32-4	6.70E-03	22,220	1.49E+02
Beryllium	7440-41-7	1.00E+02	22,220	2.22E+06
Butyl alcohol	71-36-3	1.50E-01	22,220	3.33E+03
Cadmium	7440-43-9	3.20E+00	22,220	7.11E+04
Carbon tetrachloride	56-23-5	1.20E+03	22,220	2.67E+07
Cerium chloride	7790-86-5	8.70E-01	22,220	1.93E+04
Chloroform	67-66-3	5.20E-05	22,220	1.16E+00
Chromium	7440-47-3	2.20E-03	22,220	4.89E+01
Copper	7440-50-8	6.30E-02	22,220	1.40E+03
Copper nitrate	3251-23-8	5.80E-04	22,220	1.29E+01
Ethyl alcohol	64-17-5	3.90E-02	22,220	8.67E+02
Formaldehyde	50-00-0	2.10E-01	22,220	4.67E+03
Hydrazine	302-01-2	3.20E-03	22,220	7.11E+01
Hydrofluoric acid	7664-39-3	1.30E+01	22,220	2.89E+05
Lead	7439-92-1	1.10E+03	22,220	2.44E+07
Magnesium	7439-95-4	1.50E+01	22,220	3.33E+05
Magnesium fluoride	7783-40-6	2.00E-01	22,220	4.44E+03
Mercury	7439-97-6	2.70E+00	22,220	6.00E+04
Mercury nitrate monohydrate	10045-94-0	1.40E+00	22,220	3.11E+04
Methyl alcohol	67-56-1	3.50E-01	22,220	7.78E+03
Methyl isobutyl ketone	108-10-1	1.50E+01	22,220	3.33E+05
Methylene chloride	75-09-2	2.10E+01	22,220	4.67E+05
Nickel	7440-02-0	5.80E-03	22,220	1.29E+02
Nitric acid	7697-37-2	8.60E+01	22,220	1.91E+06

Table 2-1. (continued).

Chemical	Chemical Abstract System #	Average SDA Density (g/ft ²)	Excavation Area (ft ²)	Average Inventory (g)
Potassium chloride	7447-40-7	1.30E+02	22,220	2.89E+06
Potassium cyanide	151-50-8	2.70E-03	22,220	6.00E+01
Potassium dichromate	7778-50-9	4.20E+00	22,220	9.33E+04
Potassium nitrate	7757-79-1	3.40E+03	22,220	7.55E+07
Potassium phosphate	7778-77-0	1.80E+01	22,220	4.00E+05
Potassium sulfate	7778-80-5	1.30E+02	22,220	2.89E+06
Silver	7440-22-4	1.00E-02	22,220	2.22E+02
Sodium	7440-23-5	1.10E-01	22,220	2.44E+03
Sodium chloride	7647-14-5	2.50E+02	22,220	5.56E+06
Sodium cyanide	143-33-9	2.70E-03	22,220	6.00E+01
Sodium dichromate	0588-01-9	7.60E+00	22,220	1.69E+05
Sodium hydroxide	1310-73-2	4.80E-04	22,220	1.07E+01
Sodium nitrate	7631-99-4	6.50E+03	22,220	1.44E+08
Sodium phosphate	10101-89-0	3.80E+01	22,220	8.44E+05
Sodium potassium	11135-81-2	3.20E+00	22,220	7.11E+04
Sodium sulfate	7757-82-6	2.90E+02	22,220	6.44E+06
Sulfuric acid	7664-93-9	2.10E-01	22,220	4.67E+03
Terphenyl	26140-60-3	1.40E+00	22,220	3.11E+04
Tetrachloroethylene	127-18-4	1.40E+02	22,220	3.11E+06
Toluene	108-88-3	3.50E-01	22,220	7.78E+03
Tributyl phosphate	126-73-8	1.80E+00	22,220	4.00E+04
Trichloroethylene	79-01-6	1.70E+02	22,220	3.78E+06
Trimethylolpropane-triester	15625-89-5	2.20E+00	22,220	4.89E+04
Uranium	NA	7.60E+02	22,220	1.69E+07
Uranyl nitrate	36478-76-9	3.90E-01	22,220	8.67E+03
Versenes (EDTA)	NA	3.10E+01	22,220	6.89E+05
Xylene	1330-20-7	1.40E+00	22,220	3.11E+04
Zirconium	7440-67-7	3.20E+01	22,220	7.11E+05
Zirconium alloys	NA	1.00E+01	22,220	2.22E+05
Zirconium oxide	NA	7.40E-03	22,220	1.64E+02

NA = not assigned

2.1.3 Routes of Exposure

Exposure pathways exist for radiological and nonradiological contaminants that will be encountered during project operations. Engineering controls, monitoring, training, and work controls mitigate potential contact and intake of these hazards. The following list includes exposure pathways:

- **Inhalation** of radiological and nonradiological contaminated soil or fugitive dust during overburden excavation, waste handling and sorting, packaging, or decontamination tasks. Inhalable or respirable (dependent on the particle aerodynamic diameter) fugitive dust may have trace

amounts of radiological or nonradiological contaminants associated with it, resulting in potential respiratory tract deposition. Volatile organic compounds associated with the project waste inventory (e.g., carbon tetrachloride) also pose an inhalation hazard during various project work activities.

- **Skin absorption and contact** with radiological and nonradiological contaminated soil or surfaces during overburden excavation, waste handling and sorting, packaging, decontamination, or system maintenance tasks. Radiological and nonradiological contaminants can be absorbed through broken or intact skin, resulting in intake, and skin contamination or irritation.
- **Ingestion** of radiological and nonradiological contaminated soil or materials adsorbed to fugitive dust particles or waste residues, resulting in potential intake of contaminants into the upper respiratory tract or directly through the gastrointestinal tract (placing contaminated surfaces in mouth) that may result in gastrointestinal irritation, internal tissue irradiation, or deposition to target organs.
- **Injection** of radiological and nonradiological contaminated materials by breaking of the skin or migration through an existing wound, resulting in localized irritation, contamination, intake of soluble contaminants, and deposition of insoluble contaminants.

Chemical and radiological hazards are eliminated, isolated, or mitigated to the extent possible during all project operations and construction. Where these hazards cannot be eliminated or isolated through engineering controls, monitoring for chemical and radiological hazards are conducted (as described in Section 3) to detect and quantify exposures. Additionally, administrative controls, training, work procedures, and protective equipment are used to further reduce the likelihood of exposure to these hazards through the routes of entry listed above.

2.2 Safety and Physical Hazards and Mitigation

Industrial safety and physical hazards will be encountered while performing project operations and construction activities. The hazard mitigations are identified in the work control documents in accordance with the requirements in Manuals 14A and 14B.

2.3 Environmental Hazards and Mitigation

Potential environmental hazards may pose a risk to personnel during project operations. These hazards are identified and mitigated using requirements specified in Manuals 14A, 14B, 15A, 15B, 15C, and 15D. This section describes project-specific environmental hazards and states what procedures and work practices are followed to mitigate them.

2.3.1 Contaminants of Concern

The potential contaminants of concern (COCs) are discussed in detail earlier in Section 2, and include radiological and nonradiological contaminants. IH and RadCon personnel evaluate the potential COCs and establish appropriate monitoring, and minimize personnel exposure to the COCs using engineering controls, administrative controls, and PPE, including the following:

- HEPA filter ventilation in the RE that creates a slight negative pressure inside the RE, and moves the air from the airlocks into the RE, and out through the HEPA-filtered exhaust system
- Positive pressurized HEPA filtered cabs on the excavator, the telehandler forklift, and front-end loader used to retrieve waste inside the RE reduce the levels of particulate contamination inside the equipment cabs where personnel may be located during the operation of the equipment

- Airlock 1, Service Pad Enclosure, and Airlock 4 are designed to provide a cleaner area to perform the required tasks associated with the waste retrieval operations without entering the RE. Airlocks 2 and 3 provide an area where personnel sort, handle, and package the waste through gloveports and do not have to enter the RE
- Video monitoring equipment installed on the retrieval equipment inside the RE and radio communications are used by personnel positioned outside the RE to monitor the safe retrieval operations and assist in identifying target waste forms without requiring additional personnel to enter the RE
- Dust suppression system on the excavator is used to suppress the dust and to spray surfactant on the soil and waste surfaces inside the RE to minimize dust creation
- Monitoring and sampling for COCs is performed to verify and monitor the contaminant levels and verify adequacy of the controls. The detected levels are compared to applicable action levels or hold points and additional controls implemented per IH or RadCon direction to reduce personnel exposure as required
- The radiological postings and controls for the area are posted and controlled in accordance with PRD-183, "ICP Radiological Control Manual"
- Air cleaning systems are installed where needed to reduce airborne contamination levels in areas that are or will be occupied by operators not in protected equipment
- Decontamination of equipment and facilities is performed to maintain the work environment acceptable for performing tasks inside the RE, airlocks, and other project areas
- Personnel are required to wear the appropriate PPE as described in Section 4 for the tasks being performed and areas being accessed in accordance with the TPR, JSA, RWP, work order, or SWP.

2.3.2 Beryllium

Airborne concentrations of beryllium have been detected at the ARP. 10 CFR 850, *Chronic Beryllium Disease Prevention Program*, requires a Medical Surveillance program when there is a potential for exposure to airborne concentrations of beryllium. RWMC has implemented a medical surveillance program at ARP for all Beryllium-Associated Workers. Beryllium-Associated Workers are those workers who have a potential of being exposed to airborne concentrations of beryllium. These individuals have the opportunity to voluntarily participate in beryllium-specific medical evaluations.

Industrial Hygiene continues to monitor all activities associated with the project. If monitoring results indicate airborne levels of beryllium equal to, or in excess of, the DOE Action Level ($0.2 \mu\text{g}/\text{m}^3$), RWMC will implement additional requirements as specified by 10 CFR 850. This includes processes for periodic monitoring, exposure reduction and minimization, regulated areas, hygiene facilities and practices, respiratory protection, protective clothing and equipment, and warning signs.

2.4 Other Project Hazards

Project personnel should continually look for potential hazards and immediately inform the HSO, shift supervisor (SS), or other operations or construction lead personnel of the hazards so that action can be taken to correct the condition. All personnel have the authority to call a STEP BACK or initiate STOP WORK actions in accordance with MCP-553, "Step Back and Stop Work Authority," for project personnel and PRD-1004, "Stop Work Authority" for subcontractor personnel if it is perceived that an imminent safety or health hazard exists. All personnel are required to honor a STEP BACK or STOP

WORK. Personnel may take corrective actions within the scope of the work control authorization documents to correct minor safety or health hazards and then inform the SS, HSO, or lead person.

Personnel working at the project are responsible to use safe work practices; report unsafe working conditions, near misses, or acts; and exercise good housekeeping habits during project operations with respect to tools, equipment, and waste.

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3. EXPOSURE MONITORING AND SAMPLING

Nonradiological monitoring requirements will be determined, documented, and performed by project industrial hygienists in accordance with MCP-153, "Industrial Hygiene Exposure Assessment." The nonradiological evaluation and monitors will be maintained in the ICP Hazard Assessment and Sampling System.

Radiological monitoring requirements will be determined, documented, and performed by project RadCon support personnel in accordance with requirements in ICP Manuals 15A, 15B, 15C, and 15D.

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4. PERSONAL PROTECTIVE EQUIPMENT

PPE will be specified in the activity specific work control documents or per area directive postings in accordance with the applicable procedures in Manuals 14A, 14B, 15A, 15B, 15C, and 15D. PPE will be selected, purchased, maintained, and controlled in accordance with MCP-2748, "Hazardous Waste Operations and Emergency Response," PRD-5121, "Personal Protective Equipment," MCP-2726, "Respiratory Protection," and MCP-432, "Radiological Personal Protective Equipment."

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5. TRAINING

This section specifies the minimum hazardous waste operations and emergency response (HAZWOPER)-specific training requirements for access to HAZWOPER-controlled work areas at RWMC. Work areas with the potential to expose personnel to hazardous substances at or above the established occupational exposure limits will be designated as part of the contamination reduction zone (CRZ) or exclusion zone (EZ) in accordance with Section 6. Work areas at ARP facilities and in the RWMC SDA with little or no potential for exposure to hazardous substances at or above established occupational exposure limits will be designated as part of the support zone (SZ) in accordance with Section 6.1. The HAZWOPER-specific training requirements for access into the EZ, CRZ, and SZ are as follows:

- EZ and CRZ area access requires 40-hour HAZWOPER training and qualification for general site personnel, and 24-hour HAZWOPER training and qualification for occasional workers as described in Section 8. Personnel must also be trained or have documented required reading on the contents of this HASP.
- SZ work area access does not require 24-hour or 40-hour HAZWOPER training, but personnel must be briefed or aware of the potential hazards for the areas being accessed. Visitors that are not trained must be escorted by a fully trained employee at all times when accessing the SZ areas.

Radiological training requirements are established and posted in accordance with the requirements of the Radiological Controls Program described in the appropriate requirement documents in ICP Manual 15.

A minimum of two Medical Response Team members will be on-site at RWMC during normal ARP operations. Hazard-specific safety and health training requirements (i.e., hearing conservation, hanta-virus, and heat/cold stress) will be evaluated and implemented as required in Manuals 14A and 14B.

5.1 Pre-Job and Post-Job Briefings and Safety Meetings

All ARP operational and construction activities performed in accordance with companywide requirement documents require a pre-job briefing conducted by a supervisor. Pre-job briefings include documentation of feedback and are conducted in accordance with MCP-3003. All personnel are encouraged to contribute ideas to enhance worker safety and mitigate potential exposures at the project sites. Safety meetings on various subjects are conducted periodically to reinforce specific safety topics. A shift operations manager (SOM), OF, SS, safety and health personnel, or worker having the required training may conduct a safety meeting. Attendance at the safety meetings is documented on an applicable form and submitted to training personnel for entry into the Training Records and Information Network (TRAIN).

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6. SITE CONTROL AND SECURITY

The ARP areas are designated to prevent unauthorized entry into operations and construction areas. Entry into and exit out of the ARP areas are controlled through the appropriate use of barriers, signs, and other measures in accordance with PRD-5117, "Accident Prevention Signs, Tags, Barriers, and Color Codes," for operations and PRD-2022, "Safety Signs, Color Codes, and Barriers," for construction areas. Radiologically-controlled areas are established by RadCon personnel in accordance with MCP-187, "Posting Radiological Control Areas."

Personnel not directly involved with ARP operations and construction are excluded from entering the controlled areas. Visitors, such as inspectors, may be authorized to enter the established ARP operations and construction area provided they are conducting official business and have met the minimum ARP training requirements for the area to be accessed. Nonoperational personnel are not allowed access to active operations and construction areas without processing through the RWMC SS or the ARP construction coordinator (CC) as appropriate. All training for access into the requested area will be verified. Nonoperational personnel will only be allowed into operational areas to perform the specific function for which access was granted and may be limited in these areas because of operational activities and associated hazards (at the discretion of the SS).

The ARP construction area is clearly posted as a construction area, and operations areas in the SDA are posted and controlled as CERCLA-regulated areas when there is a reasonable possibility for employee exposure to the hazards of the hazardous waste site. These areas are discussed in Sections 6.1, 6.2, 6.3 and 6.4.

6.1 HAZWOPER Control Zones

Work areas within the RWMC SDA and/or ARP work areas will be evaluated by the HSO and designated and/or posted as follows:

- Areas in the SDA under normal operating conditions with little or no potential to expose personnel to levels of hazardous substances at or above the established occupational exposure limits or action levels as determined by the HSO will be designated as part of the SZ. This may include those portions of the ARP Airlocks where mitigations have demonstrated control of the health hazards and the HSO has designated it as part of the SZ.
- Areas with the potential to expose personnel to hazardous substances at or above established occupational exposure limits or action levels as determined by the HSO will be posted as either CRZ or EZ.
 - The CRZ includes portions of the ARP airlocks where the HSO has determined the potential for exposure to exist such that employee access is restricted to trained and authorized personnel. These areas may be expanded or contracted as directed by the HSO as conditions or operations change to ensure continued employee protection.
 - The EZ is established in portions of the ARP airlock service bays and the Retrieval Areas (RAs) where the HSO has determined exposure levels to routinely exceed the established occupational exposure limits or applicable action levels. These areas may be expanded or contracted as directed by the HSO as conditions or operations change to ensure continued employee protection.

6.2 Construction Area

The SDA construction area(s) are clearly roped and posted with access requirement signs. During overburden removal, these access requirements include restricted access to only personnel authorized by the construction coordinator. Radiologically-controlled areas are established by RadCon personnel in accordance with MCP-187. Personnel entering the SDA and construction area must comply with all radiological postings and CERCLA signs.

6.3 Site Security

The SDA is secured and controlled with the existing RWMC fence and through appropriate postings to prevent entry into ARP operations and construction areas. Additionally, INL security forces provide general facility security in conjunction with RWMC operations.

NOTE: *Signs are routinely lost because of high winds and are replaced as soon as possible the next workday following discovery.*

6.4 Wash Facilities and Sanitation

Project operations and construction involve close contact with waste or potentially-contaminated materials. Personnel must obey all radiological survey requirements to prevent inadvertent intakes of radiological or chemical contaminants. Ingestion of hazardous substances is more likely when workers do not practice good personal hygiene habits during and following activities in the operations and construction areas of the project. It is important to wash hands, face, and other exposed skin areas thoroughly after completion of work and before smoking, eating, or chewing gum or tobacco.

Sanitation and shower facilities are available for ARP operations personnel within RWMC facility areas. Decontamination showers will be implemented when chemical-specific action levels and/or permissible exposure levels are reached per the substance specific standard.

NOTE: *No smoking, chewing, eating, or applying lip balm is allowed within CERCLA-regulated areas and radiological areas set up for contamination control. Designated eating and drinking areas may be established in the SZ in accordance with IH and RadCon foreman review and restrictions.*

6.5 Buddy System

The two-person or buddy system is used during ARP operations for entries into the EZ (i.e., RE retrieval area). The buddy system is most often used during operational activities requiring the use of protective clothing and respiratory protection where heat stress, contaminant exposure, and other hazards may impede a person's ability to self-rescue. The buddy system requires each employee to assess and monitor his or her buddy's mental and physical well being during the course of the operation. Operations implements the buddy system as follows:

- The equipment operators entering the EZ (i.e., RE retrieval area) in the telehandler forklift and the excavator can act as each other's buddy. This is allowed when the assigned tasks will not preclude adequate monitoring of the other operator
- The equipment operators entering the EZ (i.e., RE retrieval area) in the telehandler forklift and excavator will be monitored through radio communications or visual observation by an assigned buddy located outside the RE area. This buddy must have direct communications with the operator

and maintain visual oversight of the operator/equipment to detect any signs of disorientation or confusion that could indicate a potential problem. The buddy assigned to monitor the equipment operator's condition must have immediate access to communications (e.g., radio, cell phone, telephone) for summoning emergency assistance if required. A single buddy may be assigned to observe both the telehandler and excavator operators, provided the buddy can maintain radio communication and visual observation of both. If the buddy directs the equipment operator to exit from the EZ for any reason, both the excavator and telehandler equipment operators will exit using normal process unless an emergency exit is required

- Personnel entering the EZ (i.e., RE retrieval area), but not operating the excavator or telehandler forklift will enter the areas in pairs or an assigned buddy will monitor the entrant at all times during entry into the RA. The buddies will maintain communication and visual contact with the other entrants at all times to provide assistance if required, verify integrity of PPE, observe his or her buddy for signs of disorientation or confusion, and summon assistance if required. If a buddy instructs an exit from the area for any reason, the buddy will comply with this instruction and leave the area using normal exit process unless an emergency exit is required.

6.6 Smoking Areas

Smoking will only be permitted in designated smoking areas as evaluated by IH, RadCon, and Fire Protection. Personnel must comply with all INL smoking policies, including disposal of smoking materials in the proper receptacles. PLN-14401, "INL Wildland Fire Management Guide," requirements related to smoking at the INL must be followed.

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7. OCCUPATIONAL MEDICAL SURVEILLANCE

ARP personnel and subcontractor employees must participate in the INL Occupational Medical Program (OMP) process as described in PDD-851, “10 CFR 851 Worker Safety and Health Program,” and MCP-2748, “Hazardous Waste Operations and Emergency Response.” The responsible manager will submit a Form 340.02, “Employee Job Function Evaluation,” for each required employee to enroll them in the INL OMP medical surveillance program. The form is required to be updated for new employees, employees with changed job functions, or when IH exposure evaluation indicates a substance-specific medical evaluation is required. The responsible manager will monitor employee restrictions assigned by OMP and ensure employees understand their restrictions and comply with these restrictions. Managers will implement the requirements in MCP-49, “Occupational Injury/Illness Reporting and Follow-up,” for occupational injuries.

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8. PERSONNEL ROLES AND RESPONSIBILITIES

The organizational structure for ARP operations and construction reflects the resources and expertise required to operate the facility while minimizing risks to worker health and safety, the environment, and the general public. The Project's organization is provided in MCP-1963, "Environmental Restoration Project's Roles and Responsibilities." Additional HAZWOPER-specific position roles and responsibilities required for implementation of the HASP are provided in this section.

8.1 Health and Safety Officer (HSO)

The HSO will be on-Site (inside the RWMC facility boundary) during all HAZWOPER operations and construction field tasks to assess and resolve safety and health issues. The HSO must have the knowledge necessary to implement the HASP and verify compliance with the applicable health and safety requirements. The HSO may be assigned other duties, as long as the duties do not interfere with the primary responsibilities of the HSO. The HSO must be knowledgeable of the applicable health and safety regulations, meet the requirements listed in MCP-2748, "Hazardous Waste Operations and Emergency Response, Appendix E," and be approved by the Facility/project safety and health manager. This position will be filled by the responsible safety or IH professional and may be executed by the SS or CC when the safety/IH professional is not at RWMC. This transfer of HSO duties must be understood by both parties before the safety/IH leaves RWMC. The HSO position roles and responsibilities are provided in detail in MCP-2748, "Hazardous Waste Operations and Emergency Response."

8.2 Occasional Workers

All people who may be at a project site and are not part of the field team (e.g., surveyors or others not assigned a field team support role) are considered occasional workers. A person will be considered onsite when they are present beyond the SZ, in the designated work areas, or in the controlled work areas.

Occasional workers, in accordance with the HAZWOPER standard, must receive site-specific training in addition to possessing 24-hour HAZWOPER training, before entering HAZWOPER-controlled work areas at the project site. A project 40-hour HAZWOPER-trained supervisor must supervise occasional workers who have not completed 8 hours of supervised field experience in accordance with the HAZWOPER standard.

8.3 Visitors

All visitors with official business entering the SDA areas (including INL personnel, representatives of DOE, and state or federal regulatory agencies) may not proceed into the SZ without the following:

- Receiving training (project-site orientation briefing)
- Signing applicable entry logs and work control documents (for the area to be accessed)
- Wearing the appropriate PPE.

A fully trained representative (e.g., OF, SOM, nuclear facility manager [NFM], or designee) will escort visitors entering the SDA.

NOTE: *Visitors may not be allowed into the SDA during certain activities to minimize safety, health, and radiological hazards to the visitors. The determination as to any visitor's demonstrated need for access into the SDA will be made by the SOM, NFM, or designee. Visitors are not permitted beyond the SZ.*

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9. EMERGENCY RESPONSE

This emergency response section discusses the roles and responsibilities of ARP operations personnel during an emergency. Such an emergency could be within the ARP operations area, at the RWMC, or a Site-wide emergency. This section provides information concerning emergency plan contingencies at a project level. The “ICP Emergency Plan/Resource Conservation and Recovery Act (RCRA) Contingency Plan” (PLN-2012) is the Site-wide emergency plan. PLN-2012 describes the overall process developed to respond to and mitigate consequences of emergencies that might arise at the ICP-operated facilities at the INL. PLN-2012-2 is the RWMC addendum for PLN-2012. This section (in this HASP) defines the responsibilities of AR operations personnel and their interface with the ICP Emergency Response Organization (ERO) by providing guidance for responding to abnormal events during project operational activities.

PLN-2012 may be activated in response to events occurring at RWMC, at ARP facilities, or at the discretion of the emergency action manager (EAM). Once the ICP plan is activated, ARP operations personnel will follow the direction and guidance communicated by the EAM.

NOTE: *The OSHA HAZWOPER definition of an emergency is not defined the same as in DOE Order (O) 151.1C, “Comprehensive Emergency Management System.” For this reason, the term “event” will be used in this section when referring to project operational HAZWOPER emergencies.*

9.1 Pre-emergency Planning

PLN-2012 provides the basis for preplanning all INL emergency events. This base plan is supplemented with ICP facility-specific addenda. This preplanning makes it possible for the project to anticipate and appropriately respond to abnormal events that can affect operational activities. Preplanning also ensures that this Project’s operations emergency response plan (Section 9) is integrated with the ICP and RWMC emergency response programs. Specific procedures for addressing emergency events and actions to be taken are further described in the facility-specific emergency plan implementing (EPI) procedures. Finally, this HASP addresses operational-specific hazards, potential emergency events, and the protective actions to take following such events. Emergency response program planning elements that must be completed before the initiation of project operations include the following:

- Establishing emergency warning signals and evacuation routes
- Establishing effective Site communications
- Establishing requirements for emergency equipment and supplies
- Implementing personnel accountability procedures
- Identifying an adequate number of CPR and medic first-aid-trained personnel
- Establishing the preferred means for notifying the INL ERO of abnormal events.

NOTE: *All ARP operational emergencies will be reported through the RWMC SS to the ERO for classification in accordance with Section 5 of PLN-2012. If the RWMC ERO is activated, Site emergency response will follow PLN-2012 and PLN-2012-2, “Manual 16A-2—Emergency Management – ICP Emergency Plan/RCRA Contingency Plan – Addendum 2, Radioactive Waste Management Complex.”*

9.2 Emergency Preparation and Recognition

The HASP sections for hazards identification and mitigation (Section 2) and accident prevention (Section 2) provided the strategy that is followed at ARP areas to prevent accidents. Similarly, emergency preparation and recognition also requires operations personnel to be constantly alert for potentially hazardous situations and signs and symptoms of chemical exposure or releases. All ARP personnel should be familiar with the techniques for hazard recognition and the associated response, including proper operational notifications. Emergency phone numbers and evacuation route maps are located throughout project operational areas.

Preparation and training on emergencies includes proper project access and egress procedures in response to project operational events and ICP emergencies as part of the HASP training and project operations area access training where applicable. Visitors will also receive a briefing on emergency procedures during the hazard and general operations orientation briefing at a minimum, depending on the project operations area to be accessed. Visitor emergency actions briefing will include alarm identification, location and use of communication equipment, location of Site emergency equipment, and evacuation.

On-scene response to and mitigation of operational emergencies could require the expertise of the INL fire department and medical personnel. Emergencies that could occur include the following:

- Accidents resulting in injury
- Fires
- Spills of hazardous or radiological materials
- Tornadoes, earthquakes, and other adverse natural phenomena
- Vehicle or transportation emergencies
- Safeguard and security emergencies
- Emergencies at nearby facilities that could prompt evacuation or take-cover actions at the task site.

9.3 Emergency Facilities and Equipment

Emergency response equipment, including the items described in Table 9-1, will be maintained within the ARP area. PLN-2012-2 lists emergency facilities and equipment available at RWMC. This includes the emergency control center located in WMF-637 and equipment located at RWMC. Additional heavy construction and other equipment listed in PLN-2012-2 are available for use during emergencies.

The INL Fire Department maintains an emergency hazardous material response team that can be used to respond to an emergency within the project operations areas. Fire department personnel also are trained to provide medical services and immediate response to hazardous material spills. Additionally, the Central Facilities Area (CFA)-1612 medical facility is staffed by medical personnel to evaluate and stabilize injured personnel or those experiencing signs and symptoms of exposure. At least two Medical Response Team members must be present within the ARP operations and construction area during normal ARP operations.

Table 9-1. Emergency response equipment to be maintained at the ARP site during operations and construction.

Equipment Name and Quantity Required	Location at ARP	Responsible Person	Frequency of Inspection
Fire extinguishers ^a	Located throughout the construction and operations area, administration buildings, RE, airlocks, Storage Enclosure, and on the following equipment: Department of Transportation vehicles Manlifts Mobile diesel fuel trailer.	SOM or CC	Monthly
First-aid supplies	Designated administrative trailer.	SOM or CC	Monthly
Automated Electronic Defibrillator (AED)	Designated administrative trailer	SS	Monthly
Eyewash station	At designated operational areas. In construction area where there is a significant eye hazard (as determined by the IH and safety professional).	SOM or CC	Monthly or the frequency determined by the manufacturer
Eyewash bottle ^b	At strategic locations throughout the construction area as determined by the IH and safety professional.	CC	Monthly or replace after use
Hazardous materials spill kit	In designated restricted SZs or construction area as determined by HSO.	SOM or CC	Monthly
Communication equipment available	In all construction and operational areas or in possession of OF or CC.	OF or CC	Availability and daily functional check

a. 10A/ 60BC extinguishers or as specified by the RWMC fire protection engineer.

b. An eyewash bottle will be used to provide an immediate eye flush if required. Portable eyewash stations that meet the “Emergency Eyewash and Shower Equipment” (ANSI Z358.1-1998) requirement are available at the RWMC and other locations as determined by the IH and safety professional. Employees are instructed to use the bottles and immediately proceed to the permanent eyewash station. Eyewash stations will be located within 30.5 m (100 ft) or 10 seconds from significant eye hazard operations as determined by the IH and safety professional.

CC = subcontractor technical representative

9.4 Emergency Communications

In the event of an emergency, capability to perform the following actions is required:

- Summon INL emergency response resources
- Immediately notify operations personnel
- Inform others of the emergency.

Communications equipment within the SDA area includes a combination of radios, telephones (i.e., mobile, cellular, or hardline), and pagers. The SS is notified of any project emergency event, and the SS then makes the required ERO notifications.

9.4.1 Notifications

During emergency situations, the SOM will notify the RWMC SS who will make the required ERO and Warning Communications Center (WCC) notifications. Each OF will then be notified of the operational emergency event by the SOM. Initial notifications may be made by the OF to the SOM. The following information should be communicated, as available, to the RWMC SS:

- The caller's name, title (e.g., SOM, OF, CC), telephone number, and pager number
- Exact location of the emergency
- Nature of the emergency, including time of occurrence, current Site conditions, and special hazards in the area
- Injuries, if any, including number of injured, types of injuries, and conditions of injured personnel
- Emergency response resources required (e.g., fire, hazardous material, and ambulance)
- Additional information as requested.

NOTE: *If the SS cannot be contacted, then the WCC will be notified of the emergency event, and the information listed above will be communicated. The WCC also must be told that notification to the SS and EAM has not been made.*

9.5 Personnel Roles, Lines of Authority, and Training

9.5.1 Idaho Cleanup Project Emergency Response Organization

The ICP ERO structures are based on the incident command system and are described in PLN-2012, "Section 1 Introduction," and facility-specific addendums to that plan.

9.5.2 Role of Operations Personnel in Emergencies

Depending on the event, a graded response and subsequent notifications will take place. The SS and operations personnel responsibilities are described in Sections 9.5.2.1 and 9.5.2.2. Operations personnel will respond to emergencies only within the limits of their training and designated by their positions. All personnel are trained to RWMC-specific emergency actions as part of the RWMC access training or will be escorted by someone who has been trained.

9.5.2.1 ARP Operations Foreman and Shift Operations Manager. Any person may summon emergency services (such as fire and medical) response by activating a manual fire alarm or calling 777 or 526-1515. Each OF is responsible for initiating all requests for emergency services (e.g., fire and medical) by notifying the SOM or the RWMC SS of abnormal or potential abnormal events occurring within the project operations area. The SOM will serve as the Incident Commander until relieved by the Fire Department. The OF or trained alternate will serve as the area warden. The area warden(s) is responsible for conducting personnel accountability for all personnel working in the SDA. This will be accomplished by having foremen take an accountability role and perform sweeps of their assigned area. This information will be reported to the SOM who will then notify the RWMC SS. Accountability aids may include the key card at WMF-637 and radio communications with the SOM to verify accountability.

A visual sweep conducted from a safe location may be performed for the areas where physical access is limited (e.g., EZ and contamination reduction corridor). Following notification of the emergency event, operations personnel will be directed to the designated primary take-cover location where the attendance log (or equivalent) will be used to determine what personnel remain under the foreman (roll call).

The Facility Monitoring Team (FMT) consisting of designated RCTs, a foreman, and an IH or IH technician determined by the FMT coordinator and designated IH. The FMT will proceed to the on-scene command location for further instruction.

Additionally, the SOM will control the scene of any emergency event (from a safe distance) until a member of the Incident Command System authority arrives at the scene to take control as the Incident Commander. When communicating emergency information to the On-Scene Commander, the SOM will provide all requested information about the nature of the event, potential hazards, and other information requested by the On-Scene Commander.

9.5.2.2 Personnel Accountability and Area Warden. ARP personnel are required to TAKE SHELTER within the project area or may be required to evacuate the project operations area or RWMC in response to an evacuation. In each case, the OF, CC (if construction personnel are on site), or trained alternate will account for the people present within the SDA and report to the SOM. The OF, CC, or trained alternate will serve as the area warden for project operations and complete the personnel accountability (following sweeps of ARP buildings and areas). The results of this accountability will then be reported through the SOM to the RWMC SS or EAM.

The primary and secondary evacuation routes are identified in Figure 9-1. The take shelter location(s) for each airlock are identified in the site take shelter map (Figure 9-2).

9.5.2.3 Spills. If the material spilled is known and is small enough to be safely contained, project operations personnel will handle spill control within their level of training (as described in Sections 9.5.2.3.1 and 9.5.2.3.2), using spill supplies in the project operational area. The spill will be immediately reported to the RWMC SS. Reporting requirements will be determined by the RWMC NFM or SS in accordance with MCP-190, "Event Investigation and Occurrence Reporting." If any release of a hazardous material occurs, Site personnel will comply with the following immediate spill response actions.

9.5.2.3.1 Untrained Initial Responder—Requirements for the untrained initial responder (or if the material characteristics are unknown) are listed below:

- Place equipment in a safe configuration (as applicable)
- **Evacuate** and **isolate** the immediate area
- Notify and then **seek help** from and **warn** others in the area
- Notify the SS.

9.5.2.3.2 Trained Responder—Requirements for the trained responder where material characteristics are known and no additional PPE is required are listed below:



- Place all equipment in a secure configuration (as applicable)
- **Seek help** from and **warn** others in the area
- **Stop** the spill if it can be done without risk (e.g., returning the container to the upright position, closing valve, and shutting off power)
- **Provide** pertinent information to the SS
- **Secure** any release paths if safe to do so.

9.6 Emergency Alerting, Responses, and Sheltering

9.6.1 Alarms

Alarms and signals are used at the ARP and the INL to notify personnel of abnormal conditions requiring a specific response. These include radiation-monitoring alarms denoted by fast-ringing bells and fire alarms that may vary from building to building within the RWMC and ARP areas. Responses to these alarms are addressed in the general employee and Site-access training for environment, safety, and health. In addition to these alarms, emergency sirens located throughout the RWMC serve as the primary means for signaling emergency TAKE SHELTER or EVACUATION protective actions.



9.6.1.1 Take Shelter—Continuous Siren. Radiation or hazardous material releases, adverse weather conditions, or other event or emergency conditions may require that all personnel take shelter indoors in the nearest building. A TAKE SHELTER protective action may be initiated as part of a broader response to an emergency situation and may precede an evacuation order. The order to TAKE SHELTER is usually announced by activating the emergency siren. The signal to take shelter is a CONTINUOUS SIREN. The order to TAKE SHELTER is usually announced by activating the RWMC emergency siren.

 STEADY = STAY 

TAKE SHELTER also can be given by word of mouth, radio, or voice paging system. When ordered to TAKE SHELTER, project personnel will place project operations equipment in a safe configuration (as applicable) and then seek shelter in project operations or administrative buildings (if outdoors). Eating, drinking, and smoking are not permitted during take-cover conditions.

RadCon personnel will assist and direct all workers exiting from radiological surface contamination areas during a TAKE SHELTER alarm.

9.6.1.2 Total Area Evacuation—Alternating Siren. A total area evacuation is the complete withdrawal of personnel from the entire project operations and RWMC area. The evacuation signal is an ALTERNATING SIREN.

 ALTERNATE = EVACUATE 

When ordered to EVACUATE, operations personnel will place project operations equipment in a safe configuration (as applicable) and then proceed along the specified evacuation route to the designated assembly area or as directed by the EAM. For total area evacuations, the RWMC command post is activated and all personnel will gather at the primary RWMC evacuation assembly area or the location designated by the EAM. The OF, CC, or trained alternate will then complete the personnel accountability and report the result of the accountability process to the RWMC EAM. RadCon personnel will assist and direct all workers exiting from radionuclide-contamination areas during an EVACUATION alarm. Eating, drinking, and smoking are not permitted during emergency evacuations.

9.6.1.3 Local Area Evacuation. A local area evacuation is the complete withdrawal of personnel from a portion of or all ARP areas, but it does not necessarily require the complete evacuation of the entire RWMC. The order to evacuate the SDA will be given by radio communication to each foreman, and then by word of mouth to personnel under each foreman, or by a voice paging system. When ordered to evacuate the project area, personnel will place the project equipment in a safe condition (as applicable) and then proceed along the specified evacuation route to the assembly area designated for local area

evacuations (see Figure 9-1), or as directed by the SS or CC. Each OF or CC will then conduct personnel accountability and report the emergency event to the RWMC SS as described above.

RadCon personnel will assist and direct all workers exiting from radiological surface contamination areas during a local area evacuation alarm.

9.7 Evacuation Assembly Areas and Central Facilities Area Medical Facility

The RWMC maintains primary and secondary evacuation routes and assembly areas. These routes may be used in response to a total facility evacuation as directed by the RWMC EAM. Copies of the following figures will be available in the project area. Figure 9-1 shows the RWMC evacuation and assembly areas, and Figure 9-2 contains a map showing the location of the CFA-1612 medical facility.

In the event that the project operational area is evacuated, personnel will assemble in the designated assembly area, or as directed by the SS (local area evacuation) or RWMC EAM. If a total area evacuation of RWMC is ordered, then project personnel will relocate to the RWMC primary evacuation assembly area (see Figure 9-1) or as directed by the EAM.

9.8 Medical Emergencies and Decontamination

Medical emergencies and responses to injuries or suspected exposures will be handled as stated in Section 7. Decontamination of personnel and equipment is described in Section 10.2.

9.9 Re-entry, Recovery, and Site Control

All re-entry and recovery activities will follow general Site security and control requirements identified in Section 6 unless conducted as part of an emergency response action. All entries into ARP areas performed in support of emergency actions will be controlled by the on-scene commander.

9.9.1 Re-entry

During an emergency response, it is sometimes necessary to reenter the scene of the event. Reasons for performing a reentry may include:

- Performing personnel search and rescues
- Responding to medical first-aid needs
- Performing safe shutdown actions of operational equipment or processes
- Performing mitigating actions
- Evaluating and preparing damage reports
- Performing radiation or hazardous material surveys.

Re-entries will be carefully planned to ensure that personnel are protected from harm and to prevent initiating another emergency event. Re-entry planning is undertaken on a graded approach and will be based on the nature of the initiating event, hazards to personnel and structures, and purpose for the re-entry. All reentries will be approved by the EAM in accordance with EPI-77, "Reentry."

9.9.2 Recovery

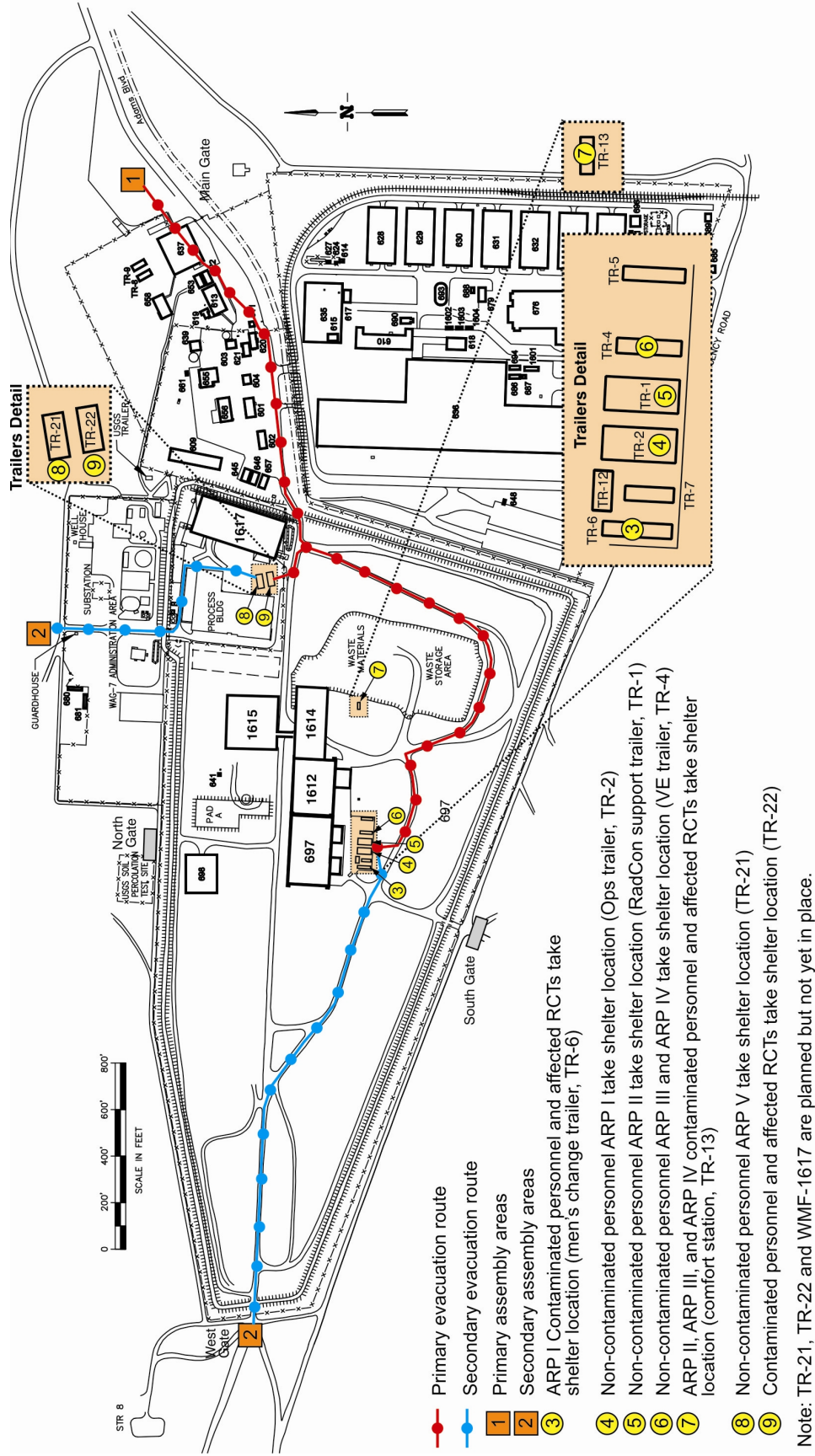
After the initial corrective actions have been taken and effective control established, response efforts will shift toward recovery. Recovery is the process of (1) assessing postevent and postemergency conditions, (2) developing a plan for returning to pre-event and pre-emergency operating conditions, when possible, and (3) following the plan to completion. The RWMC EAM, in consultation with the project NFM, operations manager, and RWMC operations director, is responsible for determining when an emergency situation is sufficiently stable to terminate the emergency and enter the recovery phase. The EAM, in accordance with EPI-78, "Emergency Event Termination," will consult with the NFM, operations manager, and RWMC operations director and, with concurrence of the emergency director, will decide on termination of the emergency event. The EAM will consult with the NFM, operations manager, and operations director to obtain their recommendation for a Recovery manager. The EAM, in accordance with EPI-80, "Recovery," and with concurrence of the emergency director, will appoint a recovery manager. The EAM will conduct a turnover with the assigned recovery manager, who will implement the recovery phase of the event.

9.10 Evaluation of Response and Follow-up

In accordance with PLN-2012, a review and evaluation will be conducted following all emergency events, drills, and exercises. In some cases, an investigation may be required before commencing recovery actions. For this reason, care should be taken to preserve evidence when appropriate. A nuclear Facility Manager, or other person designated by the Area Project Manager, will lead the review and evaluation.

9.11 Telephone and Radio Contact Reference List

A list of the points of contact for the ARP operations and construction will be maintained at the RWMC shift desk.



GS/9-2420-01

Figure 9-1. Evacuation and assembly areas at the RWMC.

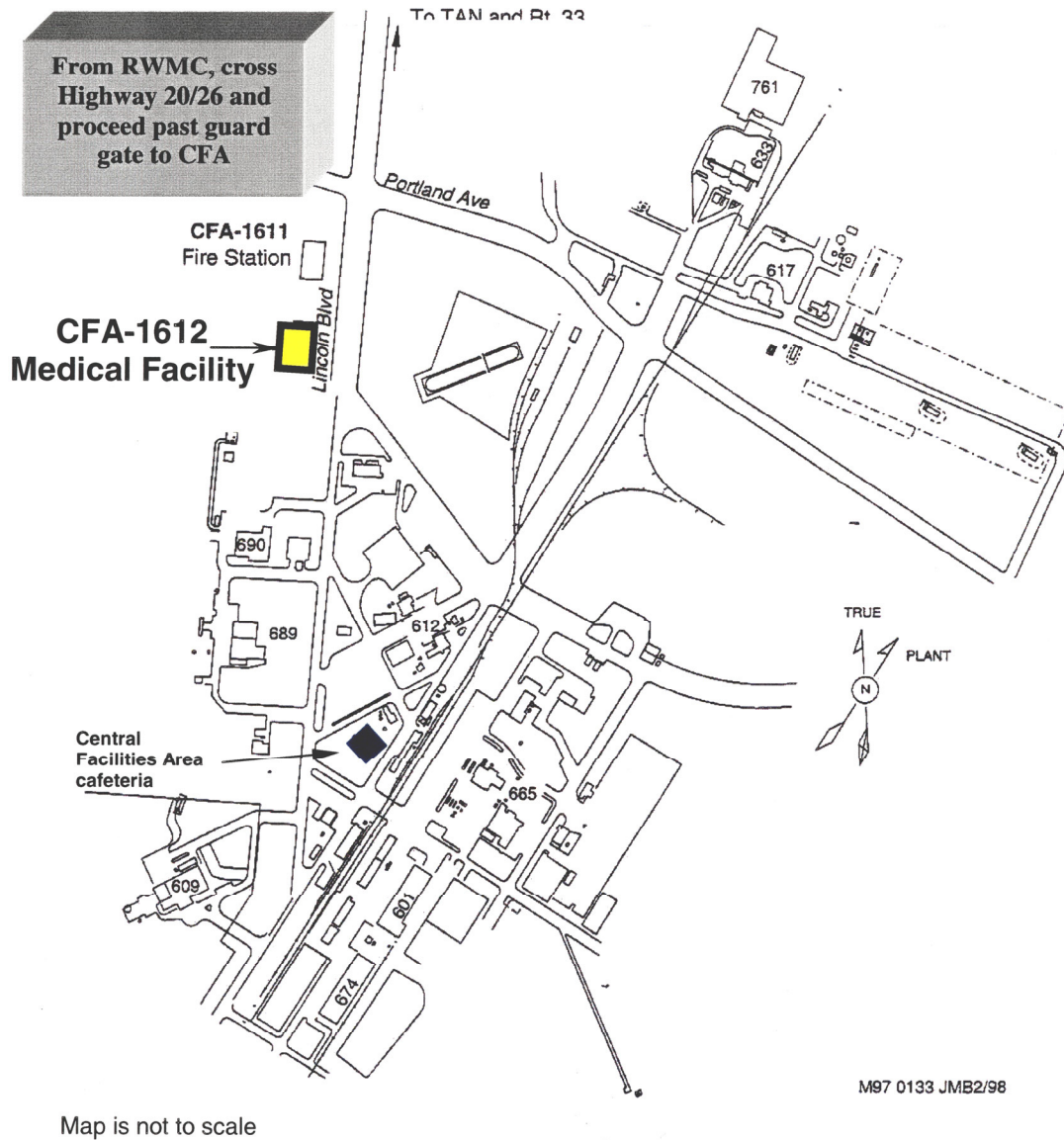


Figure 9-2. Map showing the location of the nearest medical facility (CFA-1612).

10. DECONTAMINATION PROCEDURES

The ARP operations will involve decontamination of the excavator, telehandler forklift, operations support equipment, building surfaces, other contaminated items requiring decontamination, and potentially some degree of personnel decontamination. Every effort will be made to prevent contamination of ARP personnel and equipment through the use of engineering controls, isolation of source materials, contaminant monitoring, personnel contamination control training, and by following material-handling requirements and procedures for contaminated or potentially-contaminated materials. Where contact with potentially-contaminated surfaces or entry into known contaminated areas is anticipated, additional radiological monitoring in combination with use of PPE will be necessary to control the hazard. This section provides guidance on how decontamination will be performed.

The ARP facility engineering design features in conjunction with contamination prevention and control practices and proper protective clothing donning and doffing procedures will serve as the primary means to eliminate the need for personnel decontamination. Where decontamination is required, decontamination procedures will be used. MCP-148, "Personnel Decontamination," contains information on personnel radionuclide decontamination. Radionuclide decontamination operations required for equipment or areas will be performed in accordance with Chapter 4 of PRD-183 and at the direction of RadCon personnel.

10.1 Contamination Control and Prevention

Contamination control and prevention procedures will be implemented to minimize ARP operations and construction personnel contact with contaminated surfaces that will be encountered during project activities. The use of engineering controls, protective barriers, protective clothing, modified work control practices, or addition of hold points and surveys will all be used to minimize direct contact with contaminated surfaces. The following contamination control and prevention measures will be employed:

- Identify potential sources of contamination and design containment, isolation, and engineering controls to eliminate or mitigate any potential for contact or release of contaminants (where feasible)
- Preplan all operational activities where contact with contamination is anticipated, and conduct dry runs to validate operating procedures or maintenance activities as deemed appropriate
- Sleeve or place a disposable barrier between equipment and tools and the contaminated surface or environment (where feasible)
- Limit the number of personnel, equipment, and materials that enter the contaminated area
- Wear disposable outer garments and use disposable equipment (where possible)
- Use hold points defined in procedures and work orders to monitor for contamination where anticipated
- Implement immediate decontamination procedures to prevent the spread of contamination where contamination is found on the outer surfaces of equipment or grossly contaminated clothing during operational activities (including decontamination tasks)
- Use only the established radiological entry and exit control points when accessing contaminated areas to minimize the potential for cross-contamination and expedite contamination control surveys.

10.2 Equipment and Personnel Decontamination

The ARP operational decontamination procedures will be used for routine decontamination of the excavator, telehandler forklift, DPSs, airlocks, and other areas where surface contamination is anticipated, to prevent the spread of contamination and to meet ARP requirements.

Radionuclide decontamination of equipment or areas will be performed in accordance with Chapter 4 of PRD-183 and at the direction of RadCon personnel. Nonradionuclide decontamination will be conducted in accordance with established project procedures or on a case-by-case basis under the direction of IH personnel to determine the most appropriate PPE. In all cases, the collection, storage, and disposal of decontamination waste will be addressed before the generation of such waste. Wastes will be stored as described in Section 10.5. Protective clothing and respiratory protection selected for decontamination tasks will be based on the levels of surface contamination being decontaminated.

10.2.1 Equipment Decontamination

The ARP facility engineered isolation controls have been established, where feasible, to prevent surface contamination of project equipment and facilities from known or suspected sources of contamination. These controls will serve to isolate and eliminate or mitigate many of the potential contamination pathways to prevent equipment contamination and greatly reduce the need for decontamination.

Equipment decontamination will be performed on equipment leaving the RE in accordance with established project decontamination procedures or on a case basis as a result of surface contamination levels. A graded approach will be applied for equipment decontamination using methods to minimize dust creation, personnel exposure, and cross-contamination, including but not limited to, HEPA vacuuming, misting, wet wiping, pressure washing, and dry wiping as determined appropriate for the contamination levels. Low-cost consumable items will be discarded if initial decontamination efforts fail or extensive decontamination is required that is not in accordance with as low as reasonably achievable (ALARA) principles.

10.2.2 Personnel Decontamination

Engineering controls, in conjunction with facility contamination prevention and control practices and proper protective clothing donning and doffing procedures, will serve as the primary means to eliminate the need for personnel decontamination. Decontamination showers will be implemented when chemical-specific action levels and/or permissible exposure levels are reached per the substance specific standard. Radiological decontamination facilities are available at INTEC and CFA-1612 when decontamination is deemed inappropriate at the project. The PPE selection, as identified in the RWP and JSA, will provide for the layered barriers required to prevent permeation and minimize external surface contamination.

Instructions for donning and doffing radiological protective clothing will be posted at the entry and exit control points to all surface contamination areas in accordance with PRD-183. Before donning PPE, all items will be inspected. One of the greatest potentials for personnel contamination exists from improper doffing of contaminated PPE when exiting a surface contamination area. All operations personnel who enter radiological surface contamination areas will doff PPE following the posted instructions. If questions or problems arise while doffing (such as tearing protective clothing), guidance and assistance on how to proceed should be requested from the assigned RCT.

10.2.3 Decontamination in Medical Emergencies

Injured or ill personnel should be immediately evaluated by first-aid-trained personnel (within their level of training and on a voluntary basis) within the project area where the incident occurred. The OF will contact the RWMC SS or the WCC (if the RWMC SS cannot be reached) to summon emergency services.

Medical care for serious injury or illness will not be delayed for decontamination. In such cases, gross decontamination may be conducted by removing the injured person's outer protective clothing (if possible). If contaminated PPE cannot be removed without causing further injury (except for the respirator, which must be removed), potentially-contaminated areas of the individual will be wrapped in plastic, blankets, or available material to help prevent contaminating the inside of the ambulance, medical equipment, and medical personnel.

The IH or RCT (depending on the type of contamination) will accompany the employee to the medical facility to provide information and decontamination assistance to medical personnel. Contaminated PPE then will be removed at the medical facility (CFA-1612) and carefully handled to prevent the spread of contamination. Information on proper handling of radionuclide-contaminated wounds is contained in MCP-148, "Personnel Decontamination."

10.3 Doffing Personal Protective Equipment and Decontamination

Personnel decontamination will likely be limited to doffing of PPE. However, some preliminary surface decontamination of protective clothing may be required if it is grossly contaminated and the potential for the generation of airborne radioactivity or organic vapor emissions exists. This will involve assistance from other personnel inside the contamination area and at the doffing location as described below. The ultimate goal of all decontamination methods is to effectively and efficiently isolate the source of contamination through removal of protective clothing and confinement of the contamination in a sealed bag or waste container.

If contamination is detected on outer PPE layers, careful removal of these outer PPE layers will generally isolate over 99% of surface contamination, and this will serve as the primary decontamination method if protective clothing is contaminated. Removal of contaminated protective clothing using standard radiological doffing techniques (i.e., rolling outer surfaces inward and from top to bottom while being removed) provides the most effective method for containing and isolating the contaminants and greatly reduces the potential for exposure to other personnel who would be put at risk of cross-contamination from other decontamination methods (e.g., washing and brushing).

Where protective clothing also is worn as an anti-contamination (Anti-C) layer, tape, gloves, booties, and any required dosimetry will be removed following the posted doffing sequence. All PPE will be placed in the appropriately labeled waste containers. Doffing and any required decontamination will take place at the designated contamination area boundary or step-off pad. If exiting a radiological contamination area, personnel will conduct the proper personal survey with hand-held detectors or PCM.

A general approach for doffing modified Level-D, Level-C, or Level-B PPE is described in Sections 10.3.1 through 10.3.3. However, no single doffing strategy works for all circumstances. Modifications to this approach are appropriate if operational conditions change or at the discretion of the RCT in consultation with the IH. Both radiological and nonradiological hazards will be evaluated, as applicable.

10.3.1 Modified Level D Personal Protective Equipment Doffing and Decontamination

Modified Level D protective clothing (e.g., Tyvek coveralls and booties) will be doffed following standard radiological removal techniques (as posted) and will constitute the initial decontamination step. If the protective clothing also is being worn as an Anti-C layer, then tape, gloves, booties, and any required dosimetry will be removed following the posted doffing sequence. All PPE will be placed in the appropriately labeled waste container(s) for disposal. Doffing and any required decontamination will take place at the designated RadCon boundary or step off pad area. Personnel will conduct the proper personnel survey with hand-held detectors or PCM.

NOTE: *Under some radiological conditions, two sets of Anti-C clothing may be worn. When required, the posted instructions will address the proper doffing sequence for both sets.*

10.3.2 Level C Personal Protective Equipment Doffing and Decontamination

Where respiratory protection is worn in conjunction with protective clothing (Level C PPE), the modified Level D sequence will be followed with one additional step. Following protective-clothing doffing, respirators will be removed and placed in a separate container. Doffing and any required decontamination will take place at the designated RadCon boundary or step off pad area. Personnel will conduct the proper personnel survey with hand-held detectors or PCM.

10.3.3 Level B Personal Protective Equipment Doffing and Decontamination

The distinction between Levels C and B PPE will be the addition of supplied air respiratory protection. Respiratory protection may be in the form of a bubblehood or airline respirator. The doffing sequence when using a supplied airline is slightly more complicated than Level C respiratory protection, and all operations personnel who will enter an area with Level B PPE must have a clear understanding of the doffing sequence before entering the area. It will be necessary to disconnect and tape over the supplied airline before exiting the contamination area. The RCT will assist personnel exiting these areas, and doffing instructions will be posted and must be followed. Doffing and any required decontamination will take place at the designated radiological control boundary or step off pad area. Personnel will conduct the proper personnel survey with hand-held detectors or PCM.

10.4 Personnel Radiological Contamination Monitoring

Radiological surveys with hand-held detectors and an automated whole-body PCM will be performed as required per postings or applicable RWPs. The purpose of this survey is to detect surface contamination. If hand-held survey instruments or the PCM indicates elevated contamination levels are present, personnel should remain in the area and contact RadCon (or have someone in a nonradiologically controlled area contact RadCon). When exiting a contamination area, personnel will conduct the proper personal survey with hand-held detector or PCM before using designated eating or smoking areas.

10.5 Storage and Disposal of Operational Waste Materials

Waste generated from decontamination and other project operational activities will be properly characterized, stored, and disposed of in accordance with the following documents:

- Manual 17, *Waste Management*
- Established project procedures
- Controlling CERCLA documentation
- Waste disposal and disposition forms.

10.6 Project Sanitation and Waste Minimization

Project personnel will use washroom and restroom facilities located within the project operational areas and the RWMC area. Potable water and soap are available within the RWMC operations areas for personnel to wash their hands and faces.

Industrial waste materials will not be allowed to accumulate at the project operational areas. Appropriate containers for industrial waste will be maintained within the project operational areas. Personnel should make every attempt to minimize waste through judicious use of consumable materials. All project operations personnel are expected to make good housekeeping a priority.

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11. RECORDKEEPING REQUIREMENTS

11.1 Industrial Hygiene and Radiological Monitoring Records

The IH assigned to the ARP will record airborne monitoring and sampling data (both area and personal) collected for project operational exposure assessments in the INL Hazards Assessment and Sampling System Database. All monitoring and sampling equipment will be maintained and calibrated in accordance with INL procedures and the manufacturer specifications. Industrial Hygiene airborne monitoring and sampling exposure assessment data are treated as limited access information and maintained by the IH in accordance with INL safety and health manual procedures (Manual 14A; Manual 14B).

The assigned RCTs will maintain a logbook of radiological monitoring, daily project operational activities, and instrument calibrations where instruments were used to document detection levels or conduct field screening of samples. Radiological monitoring records will be maintained in accordance with Manual 15B, *Radiation Protection Procedures*, PRD-183, and MCP-9, “Maintaining the Radiological Control Logbook.”

All other health, safety, and radiological records, including inspections, will be maintained in accordance with appropriate and applicable requirements identified in Manual 14A, *Safety and Health—Occupational Safety and Fire Protection*, PRD-183, Manual 15B, *Radiation Protection Procedures*, Manual 15C, *Radiological Control Manual*, and applicable RWMC and project supplements.

11.2 Records Management

The Idaho Cleanup Project Administrative Record and Document Control office organizes and maintains data and reports generated by field activities. The Administrative Record and Document Control office maintains a supply of all controlled documents and provides a documented system for the control and release of controlled documents, reports, and records. Copies of project plans; this HASP; the quality program plan; the *Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10 and Deactivation, Decontamination, and Decommissioning* (DOE-ID 2000); and other documents pertaining to these operations are maintained in the project file by the Idaho Cleanup Project Administrative Record and Document Control office. Controlled procedures for the RWMC and ARP will be issued, controlled, and maintained in accordance with MCP-135, “Document Management,” and applicable RWMC or project supplemental MCPs.

All additional project records will be maintained in accordance with applicable federal and state procedures, companywide manuals, and project-specific supplemental procedures.

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- 29 CFR 1910, 2008, "Occupational Safety and Health Administration," *Code of Federal Regulations*, Office of the Federal Register.
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